Gas Journal

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Vol. 242. 95th Year. LONDON, OCTOBER 6, 1943. No. 4194. Price 1/-

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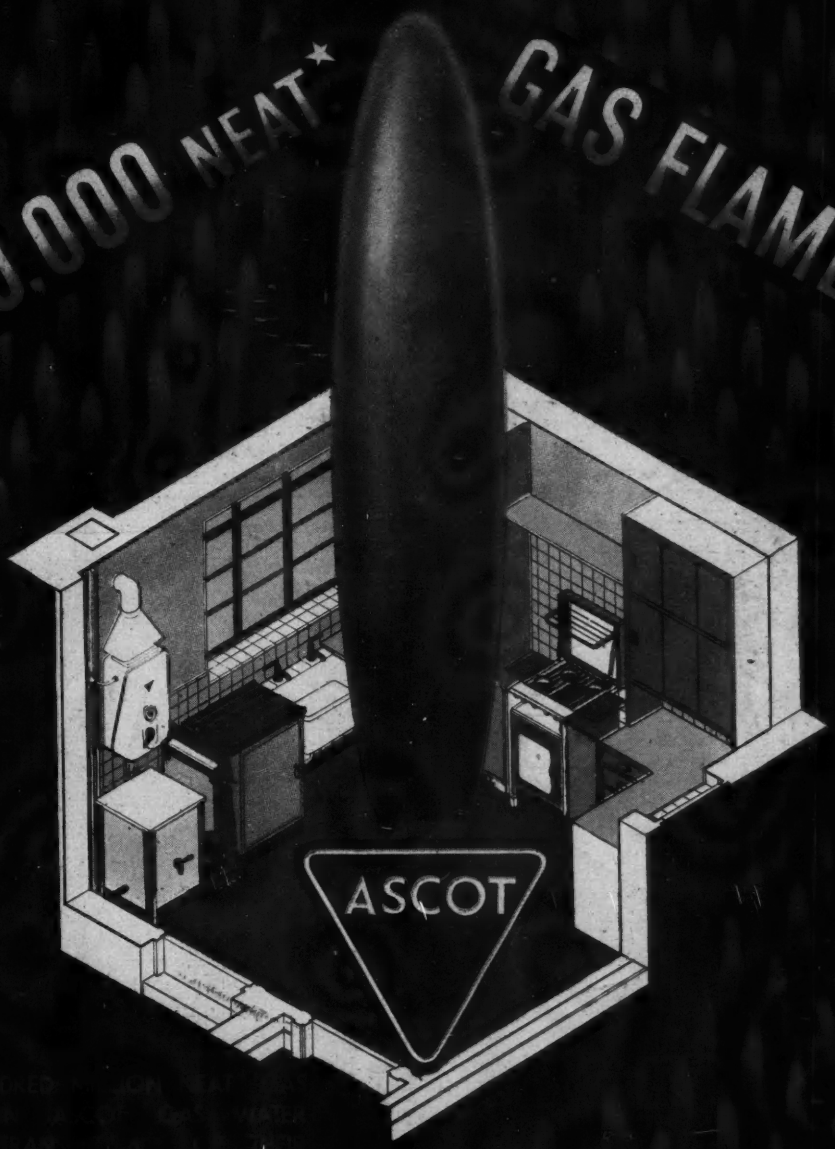

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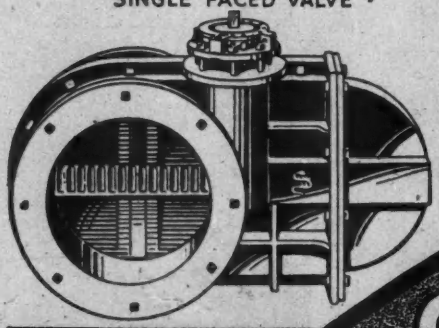

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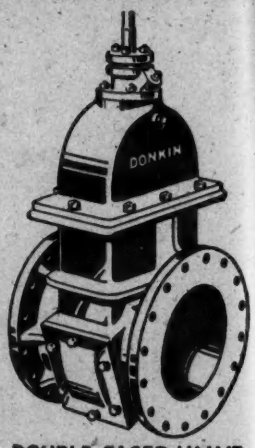

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CONTENTS

EDITORIAL NOTES

Carbonizing Plant Problems . . 417
Prepared Coal 417
Coke Supplies 418

Personal 418

Obituary 418
Diary 418
1943 "JOURNAL" Directory . . 418
Letters to the Editor 418
Greater South London Gas Corporation 419
Ministry of Fuel and Power . . 419
Wales and Monmouthshire Association 420
Standards of Technical Performance . 420

Benzole Recovery of Active Carbon . 423
Carbonizing Plant Problems 424
Rational Preparation of Coal. By R. Lessing 428

Gas Stocks and Shares 431
Gas Products Prices 432

THIS WEEK'S ADVERTISERS

	PAGE
Alder & Mackay, Ltd.	433
Ascot Gas Water Heaters, Ltd.	Cover I
Ashmore, Benson, Pease & Co., Ltd.	410
Aspinalls (Paints), Ltd.	408
Averill, C. R., Ltd.	413
Bale & Church, Ltd.	436
Birmingham Electric Furnaces, Ltd.	S3
Blakeley, Firth, Sons & Co., Ltd.	435
British Gas Purifying Materials Co., Ltd.	435
British Ropes, Ltd.	405
Carter-Erectors, Ltd.	S2
Cement Marketing Co., Ltd.	409
Cowan, W. & B.	Cover III
Crane, Ltd.	414
Crone & Taylor, Ltd.	Cover IV
Curtis, A. L.	434
Cutler, Samuel, & Sons, Ltd.	433
Dempster, Robert, & Sons, Ltd.	435
Donkin Co., Ltd. (The Bryan)	Cover II
Eagle Range & Grate Co., Ltd.	414
Esher, Ltd.	411
Foamite, Ltd.	412
"Four Oaks" Spraying Machine Co.	Cover II
Frost, A. E.	435
Gas Meter Co., Ltd.	434
Gas Purification and Chemical Co., Ltd.	436
Gas Stove Makers Panel	425
Gill's Pressure Castings	414
Glover, Thos., & Co., Ltd.	416
Goodall, Clayton & Co., Ltd.	435
Grant, David, & Co.	S6
Green & Boulding, Ltd.	436
Greening, N. & Sons, Ltd.	412
Harrisons (London), Ltd.	436
Holden & Brooke, Ltd.	408
Holmes, W. C., & Co., Ltd.	S1
Hyde, Silas, Ltd.	405
Incandescent Heat Co., Ltd.	406
Jobling, James A., & Co., Ltd.	407
Keith Blackman, Ltd.	S8
King, Geo. W., Ltd.	408
King's Patent Agency, Ltd.	435
Laidlaw, R., & Son (Edin.), Ltd.	S7
London Electric Firm, The	435
Macpherson, Donald, & Co., Ltd.	407
Main, R. & A., Ltd.	429
Mavitta Drafting Machines, Ltd.	414
Mewburn, Ellis & Co.	435
Mitchell, H., & Co.	435
Morton, Joseph, Ltd.	431
Newton Chambers & Co., Ltd.	422
Parkinson, W., & Co.	416
Pass, E. & Co.	S6
Platt, Samuel, Ltd.	435
Press, William, & Son	434
Radiant Heating, Ltd.	S5
Rawlplug Co., Ltd.	S5
Royal Institute of Chemistry	435
Sawer & Purves, Ltd.	426
Salter, T. E., Ltd.	415
Siebe, Gorman & Co., Ltd.	414
Slingsby, Walter, & Co., Ltd.	434
Spencer (Melksham), Ltd.	S7
Stanton Ironworks, Ltd.	436
Sutcliffe Speakman & Co., Ltd.	S4
Technological Institution of Great Britain	436
Trotter, Haines & Corbett, Ltd.	436
Underpressure Engineering Co., Ltd.	431
Walker, C. & W., Ltd.	426
Waller, Geo., & Son, Ltd.	411
Warsop Petrol Drill and Tools, Ltd.	S2
West's Gas Improvement Co., Ltd.	430
Williamson Cliff, Ltd.	Cover IV
Wilson, A. J.	408
Woodall-Duckham Co.	421
Trade Cards	431
Appointments Vacant and Wanted	436
Educational	436
Examinations	436
Patents	435
Plant, &c.	435
Plant, &c., For Sale and Wanted	436

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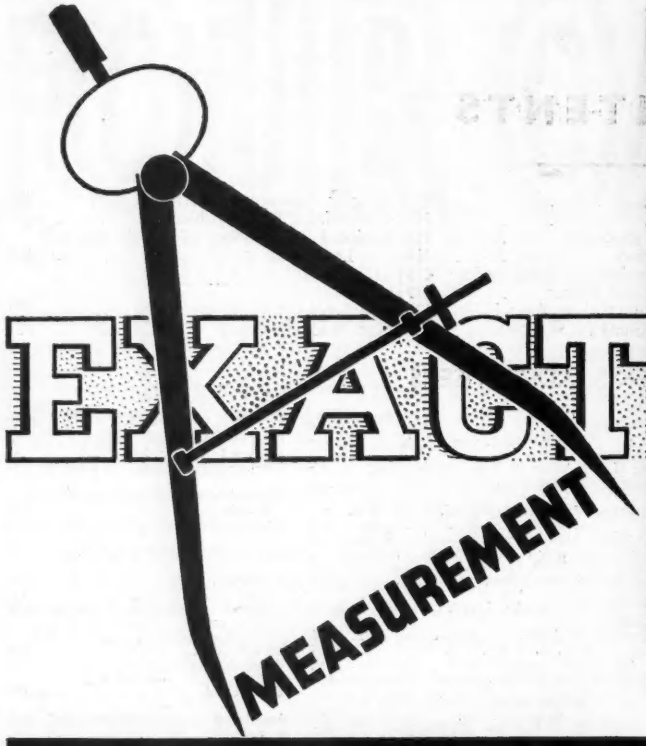

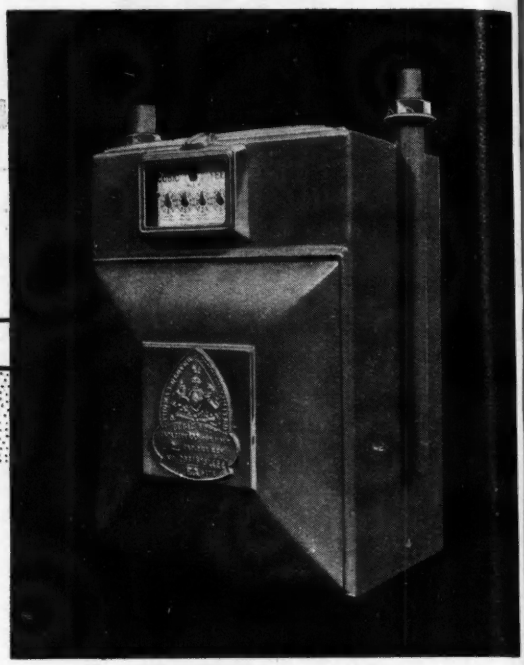

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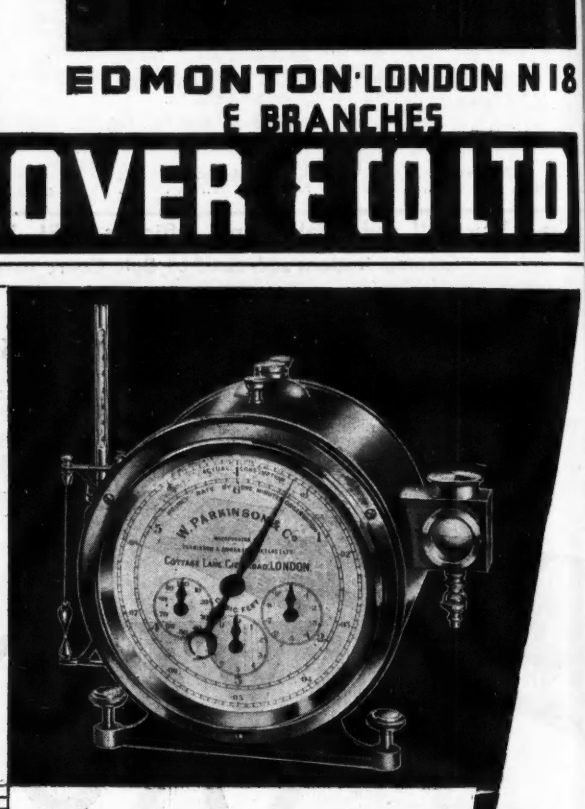

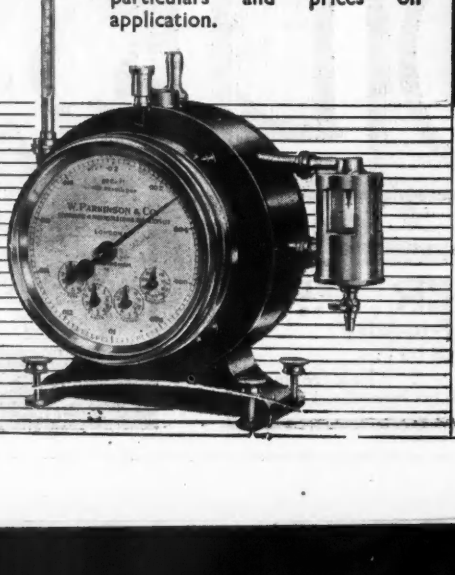

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P.4

GAS JOURNAL, OCT. 6, 1943

VOL. 242 95th YEAR No. 4194

EDITORIAL NOTES

CARBONIZING PLANT PROBLEMS

THOUGH we cannot, for reasons which we need not elaborate, disclose the identity of the Author of the recent Paper to the Eastern District of the Southern Association—"JOURNAL" of Aug. 11—we can affirm the great interest which his contribution evoked. At the meeting itself there was an excellent discussion, as is shown by our report on later pages to-day, and our mail has brought several references from different parts of the country to the practical worth of the Paper. Our intention here is not to go over the Paper point by point, but merely to add a little emphasis to a very few of the more general considerations which emerged—considerations which no doubt are in the minds of all gas engineers. The Author, who has both vertical and horizontal carbonizing plant, was faced with a big job of reconstruction. He concentrated on his horizontal plant, and the way in which he carried through the scheme amid all the difficulties of war is altogether praiseworthy, and there has in fact been plenty of expressions of appreciation from his fellow engineers. In a nutshell, he has increased the capacity of his retort house by one-third without any structural alterations, and he now has a new and efficient coke-conveying and quenching system. The details are in the Paper.

Naturally one of the queries raised was why the Author should decide to modernize his horizontal house instead of extending his vertical retorts. To this he replied that sooner or later the verticals would have to be extended; as it was, the horizontal house was a substantial part of the gasmaking plant. And he made it clear that he is by no means wedded to the continuous vertical system in preference to horizontals. From the "purely cost" point of view, he added—*i.e.*, net cost per therm of gas made—there is little difference between horizontals and verticals. His view found support at the meeting. In the discussion one speaker who expressed his belief in modern horizontal retorts for works of medium size remarked that they gave him peace of mind and ease of working, and that from a fuel efficiency point of view they "wanted a lot of beating." Another speaker suggested that properly worked horizontal houses, provided with modern mechanical plant and appurtenances, could give results, both technical and financial, comparing quite favourably with vertical retorts, with the added advantages of greater flexibility and the ability to handle practically any class of coal. In the same breath he also suggested that vertical retort practice had reached its present high state of technical control by collaboration between maker and user of plant—collaboration which did not exist to the same degree between maker and user of horizontal retorts. The same point was made by the Author in his Paper.

Not that advocacy of the horizontal retort system was allowed to go unchallenged. The cogent consideration was emphasized that when we lay down carbonizing plant we commit ourselves for at least 15 years. Therefore, the argument was advanced, we must not be fixed in our minds by existing standards. We must look ahead. We must assess what are the potential improvements within sight with any particular system. Are these greater with continuous systems than with static systems? What about the amenities of gas-making, and what about the production of saleable coke, which has such an important economic effect on the gas-making process? With such conceptions we have considerable sympathy, and we would direct thought to the statement made in the discussion that much of the advantage of continuous vertical retorts is lost in commercial returns of carbonizing results, simply because the average moisture content of the coke from most static plants is appreciably higher than that from continuous vertical retorts. The validity of this statement seems to us to have been shown over and over again since we started the Fuel Usage Index campaign as a rough guide to gas-making efficiency.

Such are the few general considerations on the Author's practical contribution, which, whatever the future holds, gave a great deal of useful information concerning the immediate problems of carbonization in horizontal retorts—information which, we know, has already proved of benefit to many gas engineers far removed from the Author's area of supply.

PREPARED COAL

THROUGHOUT many years Dr. Lessing has been the staunchest of advocates of clean coal, on which subject, as probably most of our readers are aware, he has spent a lifetime's investigation in the laboratory, on the semi-commercial scale, and on the commercial scale. Last Thursday, in a Paper to the Institute of Fuel, he returned to the problem with unabated vigour and conviction, attacking it from the point of view of the rational preparation and utilization of coal in the post-war years, propounding *a priori* the view that a planned organization of the coal-producing and using industries of the future must regard coal, as it is found in the earth and mined, as a raw material and not as a finished product. The scheme he advanced, as, indeed, postulated many years before the war, visualizes the "effective physical subdivision of the bulk of the coal output of the country into such characteristic components as will best suit the various major uses, with the object of promoting the technical efficiency of these processes and of ensuring the most economical use of our coal resources." His proposal —he claimed no novelty for it—is that the mechanically separable mineral matter should first be removed from the coal as mined. and that the coal should then be physically subdivided into the three main components—bright coal, dull coal, and "natural dust." It is, of course, with the bright coal component that the Gas Industry is chiefly concerned.

On several occasions of late, growing apprehension has been expressed that the reserves in this country of good gas and coking coals are seriously diminishing. In passing, we may remark that one of the important considerations of the work on complete gasification now being carried out is that, should the process eventually prove successful, it would be able to treat a wide variety of coals other than what are known and used as "gas-making" coals. However, Dr. Lessing maintained that, if the bright coal component was separated from all seams and that proportion of it which is of suitable rank was diverted to the gas and coking industries, then anxiety about the availability of supply of gas and coking coals would automatically disappear. Moreover, he contended that the selection of bright coal according to rank would permit the allocation of coals of closely specified properties to coke ovens, vertical retorts, intermittent chambers, and horizontal retorts according to the requirements of each type of plant. The while, of course, war conditions dictate—and pre-war conditions in the mining industry dictated —otherwise. The ash content of coals supplied to gas undertakings shows progressive increase. We have noted increases in the neighbourhood of 50% compared with pre-war; and the immediate pre-war years were not, as our columns testify, in the very least encouraging in regard to the Gas Industry's coal supplies. In the present state of affairs Dr. Lessing's ardent plea for clean coal of specific qualities for particular purposes may appear in the nature of a pleasant dream, but it is a dream which we hope will come true. The vision is certainly directed to the root cause of many of our difficulties.

It is twelve years since we published in the "JOURNAL" an

Institution Paper by Dr. Lessing in which he described experiments carried out at the works of the Tottenham and District Gas Company on the carbonization and gasification of clean coal. In his present Paper he recounted a few of the main results of these experiments, and we include them in our abstract we start to-day for the simple reason that so much could obviously be accomplished if we were supplied with the type of raw material which the Author visualizes as a thoroughly economical proposition, if only known facts were appreciated and a really serious attempt was made to clean and classify coal at the mines themselves. We realize that before the war coal washing was on the increase. There was plenty of evidence of this. But coal was not being cleaned in the sense and to the degree implied in the plan advanced by Dr. Lessing for attention now and post-war application. While, during the past ten years, we have without question improved the technique of gas and coke making, there has concurrently been failure in the mining industry to meet the legitimately more exacting requirements of its consumers. There is a clamant cry for smokelessness in the interest of the community. How can we hope rapidly to achieve smokelessness if we are supplied, as we sometimes are to-day, with coal containing something like 25% of ash plus moisture? The handicap is imposed at the start—a handicap comprised of extravagant transport charges, unnecessary handling costs, reduced capacity of gas-making plant, increased fuel consumption to heat up inert matter, and a solid smokeless fuel unsatisfactory because it contains such a large proportion of dirt, entailing much labour. We doubt whether there would be an atmospheric pollution problem if we were able to supply economically gas and coke produced from the type of low-ash coals envisaged as a practical proposition by Dr. Lessing, whose Paper last Thursday was relevant to any major discussion on the post-war fuel situation.

Coke Supplies

On Sept. 30 the Minister of Fuel and Power announced that, as from Oct. 1, coke of all sizes is to be temporarily freed from restrictions on supplies. This action was taken to assist consumers to take part of their requirements in the form of coke, either for current consumption or for stocking. Consumers of solid fuel are advised by the Government to lay in a stock of coke, which fuel, the Government emphasizes, can be used in place of house coal. Unfortunately the announcement of the Minister of Fuel and Power caused some confusion in that it said without qualification that "persons wishing to obtain coke supplies direct from a producer of coke (*e.g.*, a gas company) should apply to the Local Fuel Overseer, who will give them separate registration for this purpose. No special form of application is required—simply give your name and address and the name and address of the coke producer from whom you wish to purchase coke." The announcement in this respect was awkward from two angles. The first was the implication that all consumers of coal or coke should, if they felt inclined, saddle their local gas undertakings with odd demands for coke in whatever quantity, large or small, here, there, and everywhere. At the present time gas undertakings would not welcome the implications of such a demand. The other angle is that householders are already registered with dealers, and duplicate registration of maybe a temporary nature is not desirable if it can be avoided. The situation as it now stands is this: If a consumer wants more coke, and if his registered fuel merchant cannot supply his demands, all the consumer has to do is to tell his Fuel Overseer what his requirements are, and he will then be granted permission to apply direct to his local gas undertaking.

Personal

Teignmouth Urban District Council has appointed Mr. RONALD MASON, Gas and Water Engineer at Clacton-on-Sea, as Manager of its gas undertaking, in the place of the late Mr. H. Higham. Mr. Mason started his career as a pupil with the Kendal Corporation, going to Clacton-on-Sea in May, 1940, as Chief Assistant.

* * *

On Sept. 30 Stoke-on-Trent City Council approved a recommendation of the Gas Committee that Mr. JOHN S. WARRILLOW, B.E.M., Engineering Assistant of the City Gas Department, be appointed Deputy Gas Engineer and Deputy Manager. Mr. Warrillow, who fills the vacancy created by the appointment of Mr. J. E. Stanier, G.M., as Chief Engineer and General Manager of the Gas Department in succession to Mr. A. Mackay, has been in the service of the Department for about 12 years. He is an Associate Member of the Institution of Mechanical Engineers.

Presentations to Mr. A. MACKAY, retiring Chief Engineer and General Manager of the Stoke-on-Trent Gas Department, and Mrs. Mackay, were made at the City Gas-Works on Sept. 29.

* * *

Mr. R. J. REW, Chairman and Managing Director of the Devon Gas Association, Ltd., has been appointed a Magistrate of the City of Exeter. He was Sheriff in 1933–34, and Mayor in 1937–38, and has been Deputy Mayor since. For half a century he has been connected with the engineering firm of Willey & Co., Ltd.

* * *

Flt.-Lieut. K. H. POTTER (Air Gunner in R.A.F. since 1939), representative of R. & A. Main, Ltd., in West of England, was married last week to F./O. Marjorie Lane, R.A.F.

Obituary

Mr. FREDERICK NAPIER SUTTON, a former Alkali Inspector in the Ministry of Health, died on Sept. 24, aged 80 years. Mr. Sutton was well known to chemical manufacturers in London and the South-Eastern counties.

Diary

Oct. 7.—Illuminating Engineering Society (South Wales Area), Mackworth Hotel, Swansea, 5.30 p.m.
Oct. 8.—Gas Companies' Protection Association: Committee, 5, Victoria Street, S.W. 1, 2.30 p.m.
Oct. 9.—Institute of Vitreous Enamellers: Annual General Meeting, Waldorf Hotel, W.C. 2, 11.30 a.m.
Oct. 11.—National Federation of Gas Coke Associations: General Committee (Special Meeting), 2.30 p.m., Gas Industry House.
Oct. 12.—National Federation of Gas Coke Associations: General Committee, 10 a.m., Gas Industry House.
Oct. 12.—Federation of Gas Employers: Central Committee, Gas Industry House, 11.30 a.m.
Oct. 12.—National Gas Council: Central Executive Board, Gas Industry House, 2.15 p.m.
Oct. 13.—Industrial Gas Centres Committee: Gas Industry House, 9.30 a.m.
Oct. 14.—Institute of Fuel, Annual Meeting and Luncheon, Connaught Rooms, Great Queen Street, W. 2.
Oct. 18.—Institute of Fuel (North-Eastern Section), Address by J. G. Bennett, Director B.C.U.R.A., Central Station Hotel, Newcastle-on-Tyne, 5.30 p.m.
Oct. 18.—L.C.C.A. Committees at Gas Industry House: Finance, 11 a.m.; Executive, 11.30 a.m.; Central, 1.30 p.m.
Oct. 29.—Manchester District Association of Gas Engineers.
Nov. 5.—National Smoke Abatement Society: General Meeting and Conference, Caxton Hall, S.W. 1, 10 a.m.
Nov. 26.—Southern Association of Gas Engineers and Managers (Eastern Section), Paper by Dr. Weston and Dr. Haffner, entitled "New Evidence in regard to the Mechanism of Carbonization in Continuous Vertical Retorts," Gas Industry House.

1943 "Journal" Directory

Page 2. ACCRINGTON. P. D. Wadsworth, *S.*, *vice* W. H. Warhurst.
" 76. WIGAN. T. Haworth, *E. & M.*, *vice* J. Monks.
" 82. BATHGATE. J. S. McLaren, *E. & M.*, *vice* J. B. Robertson.

Letters to the Editor

Carbonizing Plant Problems

DEAR SIR,—The excellent and well-written Paper ("JOURNAL" of Aug. 11, p. 175) covering an engineer's thoughts on and reaction to carbonizing, over the long period of 33 years, deserves fuller attention. The Author rightly deplores that contractors' technicians do not sufficiently collaborate with gas-works technicians. I hope for the early development of this co-operation. As a contractors' technician, though, I cannot agree with the Author's statement: "The practice of horizontal retorts in detail appears to have found a stabilized rut." Over the years the Author has twice modernized his horizontals, but he is still left with ascension pipes. Our forefathers adopted the combination of ascension pipes and dip pipes to form non-return hydraulic seals for the gas, for reasons of safety. It follows that to abandon the permanent hydraulic seals (as in this case by the substitution of anti-dips) is to render null and void all need for ascension pipes. Hot ascension pipes act as chimneys which fluctuate the pressure conditions within the retort, especially towards the end of the carbonizing period when the gas yield is small and at a high temperature. These fluctuations mitigate the work of good governing (in these days of level-gauge retort conditions). Hence one way out of this "stabilized rut" is to see that ascension pipes go. In point of fact, descension pipes, which overcome the difficulty, are already growing old in the good service of our cause.

Again, our forefathers rightly adopted a main arch, because their settings of small direct-fired fireclay retorts required resetting every 18 months or so. To-day our settings have grown considerably larger, and relatively speaking dwarf the main arch and require resetting only in periods of years. Hence the main arch to-day has relatively no importance and no function to serve. Other and newer

forms of carbonizing plant have no equivalent of the main arch. By its abandonment we gain economy of construction, the retort setters in building do not work in such cramped conditions, and, what is of more importance, the growth of silica can be better accommodated. Hence the flat bench-cover is assuredly another step removed from the alleged "stabilized rut." Brevity prevents extension of items, but the "JOURNAL" columns indicate that much is afoot for the improved heating and insulation of horizontals and for the reduction of the specific heat of setting per unit capacity; and even yet a stoking machine may be in embryo which will mould a prescribed size of free space and otherwise fill the retort. Again, several praiseworthy plants have been installed for dry-cooling and conserving the heat of the discharged coke from horizontals, all of which proves that the practice of horizontal retorting is very much alive. In conclusion, it is passing strange that the Author makes no mention of the additional yield of benzole, or to the merit that horizontals can deal efficiently with a wider range of coals—surely two fundamental factors of prime importance.

43, *Uxbridge Road*, *Hampton, Middlesex.* *Sept.* 29, 1943.

Yours faithfully,
H. J. TOOGOOD.

Coke for Domestic Use

DEAR SIR,—The propositions put forward by the supporters of complete gasification doubtless have many economic virtues, but your Editorial of Sept. 8 raised the salient point that solid smokeless fuel has a big part to play after the war, and that if the Gas Industry does not want the solid fuel market for domestic heating someone else will take it.

It might be advantageous to put forward to the public how coke may be used in both ordinary domestic grates and ranges of the "Triplex" type. In most cases it is necessary to start with a coal fire, and then maintain with coke, but this offers considerable economy and will produce a hotter fire with much less smoke. It could also be pointed out that a certain fuel bed depth is necessary to save the disillusionment of anyone who attempted to keep a low coke fire going. Whereas many people are not prepared to scrap their existing grates and ranges, they might be attracted to the use of coke in this manner.

92, *Burringham Road*, *Scunthorpe, Lincs.* *September* 30, 1943.

Yours faithfully,
NORMAN B. BIGGS.

Greater South London Gas Corporation

An entirely new line of approach to the problem of regionalization in the Gas Industry lies behind the announcement last week-end of the registration of a new Company under the title of the Greater South London Gas Corporation, Ltd., with the object of co-ordinating the policy and furthering the development of the three London gas undertakings South of the Thames of which Mr. Frank Harding Jones is the Chairman. These undertakings are the South Metropolitan, the Wandsworth and District, and the South Suburban Gas Companies, and they are the sponsors of the new body. According to Jordan's Register, the Corporation was registered on Sept. 24, with a nominal capital of £100 in £1 shares.

Under the common chairmanship of Mr. Jones there has for some years been a considerable measure of co-operation between the three undertakings. The administrative chiefs have regularly exchanged ideas, and each has given the others the benefit of its experience in matters of policy. The primary function of the new Corporation will be to make that co-operation still more effective. The purchase of raw materials, facilities for bulk supplies of gas, and the co-operative working up and disposal of residual products are some of the subjects which will engage the attention of the Corporation. While each of the companies will retain its identity and individuality, and also all its statutory obligations, a common policy will, as far as possible, be developed in the mutual interests of the consumers, shareholders, and employees of the three undertakings.

Mr. Frank Jones has been Chairman of the Wandsworth Company since 1925, when he succeeded his father, the late Mr. H. E. Jones, and has been actively associated with the Company for 40 years. He has presided over the South Metropolitan and South Suburban Companies since 1937, when he took the place of Dr. Charles Carpenter, whose death occurred a year or two after his retirement. Before his election as President, Mr. Jones had been for some years Vice-President and Joint Managing Director.

The creation of the new Corporation does not in any sense involve a financial merger. Although by co-ordinating the policy of the three undertakings it will have an influence over gas interests in an area of 435 square miles, it will not in any way rival the organization of the Gas Light and Coke Company, whose area extends from Staines to Southend. It will, however, confer on the three undertakings what are claimed to be the great advantages of large scale purchase of raw material and appliances and mutual help in the treatment and disposal of residuals, &c., and to that extent will enhance the resources of the Industry throughout a substantial area.

There is already a very close link between the South Metropolitan and South Suburban Companies, several of whose Directors are common to the two Boards, and since 1927 there has been an arrangement under which the South Suburban Company has purchased bulk supplies of gas from its larger neighbour, amounting in the last year before the war to some 573 million cu.ft. per annum. The South Metropolitan Company, in addition, has had a substantial holding of South Suburban stock, and there has been an agreement between the Companies for various working arrangements, and the appointment of one South Suburban Director on the South Metropolitan Board and three South Metropolitan Directors on the South Suburban Board. Incidentally there is a similar relationship between the South Metropolitan Company and the Commercial Gas Company, but the latter undertaking does not come into the new scheme, which is confined to activities on the South side of the Thames.

The new Corporation will operate as a trading principal in connexion with the purchase of raw materials and appliances and the disposal of products, but in the case of coke this will make little if any difference, as coke sales are already co-ordinated through the membership of the three undertakings in the London and Counties Coke Association. All three undertakings are very favourably placed in regard to manufacturing capacity, and the further pooling of facilities which the Corporation will promote will lead to still greater efficiency.

The combined areas of the three Companies have a population of some three million, of which about half is represented by the supply area of the South Metropolitan Company, and the remainder more or less equally divided between the other two. Between them the three undertakings have about 4,500 miles of mains. The total area is 435 square miles, comprising about 250 square miles in the widely scattered South Suburban Company's area, 52 square miles in the South Metropolitan, and 133 in the Wandsworth and District area, not counting the 52 square miles served by Woking, which is now controlled by Wandsworth.

According to statistics published in the 1943 edition of the "GAS JOURNAL *Calendar and Directory*" the capital of the three Companies is as follows: South Metropolitan, £12,185,261; Wandsworth, £4,335,622; South Suburban, £4,037,702, making a total of £20,558,585. Figures for gas made in the last year before the war are on record as follows: South Metropolitan, 13,959 million cu.ft.; Wandsworth, 6,689 million cu.ft.; South Suburban, 4,610 million cu.ft., plus 573 million cu.ft. purchased from the South Metropolitan, making a total of 25,831 million cu.ft., or over 7% of the total output for England and Wales. There were in that year 443,244 consumers in the South Metropolitan district, and 209,474 in the Wandsworth area, but no figures were published regarding the consumers in the South Suburban area. Both the South Metropolitan and South Suburban Companies are now supplying gas at a declared calorific value of 530 B.Th.U., while the Wandsworth declaration is 500. (The South Suburban Company has two other values, but these are confined to certain self-contained areas in Kent.) It may be that in the process of co-ordination there will be an endeavour to standardize the calorific values, but that is a point that has not yet arisen. There can be little doubt that other forms of standardization, for example, in appliances, will come about in the course of time.

Those who believe that the solution of the problem of Gas Industry reorganization lies in an extension of regional operation will see in the formation of the Corporation a notable step forward. It confers upon undertakings collectively supplying some 7% or more of the total gas used in this country the benefits of large scale administration, while at the same time it leaves to the individual companies the immeasurable advantages of continuing to trade in their own names which have become familiar to their consumers, with all that the term "goodwill" entails.

It is appropriate to recall that it was the South Metropolitan Company, under the leadership of Dr. Charles Carpenter, that gave to the Industry that great innovation, the therm method of charge, together with the basic price and dividend system under which companies supplying more than half the gas sent out by companies in England and Wales are now working. Probably the greatest of all Dr. Carpenter's activities was his devotion to Co-partnership. The Jubilee of Co-partnership in the Gas Industry was celebrated in November, 1939, for it was in November, 1889, that the South Metropolitan Board approved a scheme for profit-sharing.

Mr. Frank Jones is the Chairman of the new Corporation, and the other Directors are the Deputy Chairman (Mr. A. M. Paddon), and Dr. E. V. Evans, of the South Metropolitan Company, Major H. F. H. Jones and Colonel C. M. Croft, of the Wandsworth Company, and the Deputy Chairman (Mr. B. R. Green) and Mr. T. Brown, of the South Suburban Company. All will serve without remuneration. Dr. Evans, Colonel Croft, and Mr. Brown will be Managing Directors. The Secretary is Mr. F. G. Brewer, who is Secretary of the South Metropolitan Company.

Ministry of Fuel and Power

The post occupied by Mr. R. Kelf-Cohen, Principal Assistant Secretary in charge of the Gas and Electricity Division of the Ministry of Fuel and Power, will in future carry the title of "Director of the Gas and Electricity Division" of the Ministry.

The address of the Division is: Ministry of Fuel and Power, Gas and Electricity Division, New Oxford House, Bloomsbury Way, London, W.C. 2. Telephone Holborn 4311.

Wales and Monmouthshire Association

Swansea was the venue for the General Meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers, which was held on Sept. 23. The President (Mr. A. E. Pask) welcoming those present, said how glad they were to have with them Mr. J. A. Beckett and Dr. M. Barash (Ministry of Fuel and Power), Dr. A. C. Monkhouse (Ministry of Health), and Major E. I. David (Regional Gas Officer).

On behalf of the County Borough of Swansea, a hearty welcome to the town was given by the Mayor (Councillor T. W. Hughes, J.P.). In the course of this message of welcome, emphasis was laid on the great measure of assistance that would be expected from the Industry in the re-planning that would be necessary following the termination of hostilities; the guiding hand of professional men would be sought, and he felt sure that in this programme of transfiguration gas engineers would be in the forefront.

An application for membership was received from Mr. J. H. Chapman (Swansea), and applications for Associate Membership from Messrs. Trefor Morgan (Cardiff), D. W. F. Thomas (Ammanford), R. J. Gregg (Ascot Gas Water Heaters, Ltd.), E. D. Goole, H. E. Chancellor (W. Parkinson & Co., Ltd.), and G. Wooldridge (Wellington Tube Company, Ltd.), which were approved.

The retiring President, in introducing the President-Elect (Mr. David Muir, Pontypridd), referred to a friendship of many years; in wishing Mr. Muir success in his new office, he knew that the traditions and prestige of the Association would be more than upheld. The new President suitably responded, and as his first duty he expressed great pleasure in presenting to Mr. Pask a silver salver, in appreciation of the invaluable work he had performed during the year, and as a mark of the members' esteem.

Congratulations were extended to Messrs. K. M. Ernest (Cardiff) and W. D. Rees (Port Talbot—at present serving in H.M. Forces), each of whom had been successful in securing the Higher Grade Certificate of The Institution of Gas Engineers.

Mr. J. F. Rust (Chairman of the Gas Engineering Advisory Board for No. 8 Region) presented to the meeting a brief report on Fuel Efficiencies in the Area. He was sorry to say that a complete list of the Fuel Expenditure Index for the twelve regions had revealed Region No. 8 to be the lowest in the table. He, and members of the Advisory Board, were fully conscious of the special difficulties that prevailed; they knew of numerous reasons illustrating why the Region was below the average for the country. Several of these had already been brought to the notice of the Co-Ordinating Committee; nevertheless, the fact remained that improvement could, and must, take place. This could be done only by the fullest co-operation between the individual engineer and members of the Advisory Board, and with this spirit in force he hoped the Region would continuously progress, and that a place somewhere nearer the top of the table would result.

A Paper entitled "Some Reminders on Unaccounted-for Gas" was given by Mr. A. Pickard (Llanelly). In the discussion which followed the following contributed: Messrs. D. E. West (Aberdare), J. Powdrill (Pontypool), G. M. Gill (Cheltenham), D. W. Rees, B.E.M. (Pembroke Dock), A. H. Dyer (Newport), C. H. Davidson (R. & J. Dempster, Ltd.), E. M. Edwards (Port Talbot), A. E. Matthews (Maesteg), and C. L. Singleton (Chepstow); a written contribution was also received from Mr. W. T. Kenshole (Merthyr). A vote of thanks to Mr. Pickard, proposed by Mr. W. Clark Jackson (Neath), seconded by Mr. Ernest Ablett (Swansea), and supported by Mr. Prosser Jones (U.K. Gas Corporation), was carried with acclamation.

At the luncheon which followed, Mr. W. H. Ashmole (Chairman of Directors, Swansea Gas Light Company) proposed the toast of the Wales and Monmouthshire Association of Gas Engineers and Managers—coupling with it the new President (Mr. David Muir). As a professional man, he knew the value of professional associations, and of the useful information acquired at their meetings—information of value not only to the engineer himself, but to the undertaking over which he had control, and in consequence to the community. As far as the Gas Industry was concerned, there was no more virile or progressive District Association than that represented by the "Wales and Mon."

Mr. David Muir suitably responded.

The toast "The Mayor and Town of Swansea" was proposed by Mr. J. A. Beckett (Ministry of Fuel and Power). In the course of this toast Mr. Beckett gave an interesting résumé of the activities of the Ministry, in relation, *inter alia*, to coal supplies, tar production, and particularly to benzole recovery.

Standards of Technical Performance

The following is the reply of Mr. **George Dixon** to the discussion on his June Institution of Gas Engineers' Paper, "Standards of Technical Performance":

Mr. Crowther rightly lays stress upon the troubles experienced by gas engineers because of the inconsistency of the quality of coal received. I would like to suggest that engineers should make a much closer study of normal coals by taking advantage of the work of the Coal Survey Department of the Fuel Research Board. This Government Department has been doing excellent investigatory work on all coal seams for some years, and I have found their co-operation of the utmost benefit in the selection of the best coals for the particular carbonizing plant installed at the Gas-Works. Mr. Crowther's remarks with regard to sulphur extraction and coke quality will be of special interest to the committees concerned.

Mr. Haynes disagrees with the suggested method of determining comparative standards of gas-works performance, and asks—"Do we want to compare one undertaking with another?" I would prefer to regard the proposition as comparing the performance of any Gas Undertaking with a given standard, and I see no escape from the axiom laid down by Euclid that "things that are equal to the same thing are equal to one another."—Q.E.D.

Dr. King will command the attention of all engineers by his helpful assertion that "there is still much that can be done to improve the efficiency of the processes which we now have." Unfortunately, we have to admit that much of the trouble can be traced to the fact that the personnel of the Industry has not kept pace with the scientific advance of gas-works practice. At the risk of being still further provocative, I would ask proprietors of undertakings to give serious attention to the suggestion that the standard of results, both physically and financially, cannot be divorced from the standard of the qualifications of the man appointed to take charge.

Mr. Currier makes a further appeal to engineers to make some practical effort to implement the pious resolutions of approval of the standards already set. It is the responsibility of each of us to act without delay rather than await some magical results from the deliberations of the post-war planning and other committees.

Mr. Helps commands respect because of his years of experience and because of the great sincerity with which he always presents his case. His work at Nuneaton has attracted the serious attention of many workers, but, unfortunately, the economics of his results have not yet proved his case to be as good as the standard practice in the Gas Industry. It should be noted that, because of the number of variables to be considered, the Institution's Committee of Enquiry on Gas Quality was not able to recommend any particular standard of calorific value, and Mr. Helps is therefore able to select the quality best suited to his coal supply and other local conditions so as to enable his consumers to obtain the best possible service.

Control of Coal Tar Order, 1943

The Minister of Fuel and Power has announced that in pursuance of Regulations 55 and 55AA of the Defence (General) Regulations, 1939, he has made the Control of Coal Tar Order, 1943 (S.R. & O. 1943, No. 1356). The Order, which came into force on Oct. 1 (with the exception of Part IV and Article 50, which became operative upon the making of the Order) is substantially the same as the 1942 (No. 2) Order of the same name. The main changes, which are set out in an explanatory note printed with the Order, are:

Part I. Licences.—Article 8 prohibits coal tar acquired or a coal tar product disposed of under a licence granted for a specific purpose or under conditions, being subsequently knowingly dealt with (except by licence) for a different purpose or in contravention of the conditions.

Part II. Directions. Article 16.—Under this Article the Minister may direct a person to dispose of any coal tar or coal tar product treated, used, or blended in contravention of the Order.

Article 19.—This is a revision of Article 17 of the 1942 Order, designed to attract to the price payable for coal tar acquired or a coal tar product disposed of under a direction, any applicable increases or deductions authorized or required by the provisions of any relevant Coal Tar Products Prices Order.

Part IV.—This is new and provides for the keeping of records and the furnishing of certain information by producers and distillers required to do so by notice served on them by or on behalf of the Minister. The records have to be kept and the information furnished on forms supplied by the Minister for the purpose.

Part V. Article 53.—The definitions of coal tar products and constituents (whether crude or refined) of coal tar have been revised, the former so as to include constituents of coal tar whether derived from coal tar or from any process connected with the extraction of crude benzole from gas, and the latter by naming certain constituents of coal tar.

Article 54.—Paragraph 2 of this Article excludes from its scope the General Licence (Disposals) No. 1 which authorizes the disposal by distillers or importers of coal tar bases. Under the 1943 Order coal tar bases may only be disposed of under the authority of a licence.

All applications for licences must be addressed to the Coal Tar Controller, Ministry of Fuel and Power, Quebec House, Quebec Street, Leeds, 1.

The Order will shortly be published as a Statutory Rule and Order, and copies may be purchased from any bookseller or directly from H.M. Stationery Office at the following addresses, York House, Kingsway, London, W.C. 2; 120, George Street, Edinburgh 2; 39–41, King Street, Manchester 2; 1, St. Andrew's Crescent, Cardiff; 80, Chichester Street, Belfast.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Benzole Recovery by Active Carbon

The following is a brief description of the first active carbon plant to be designed and erected in Wales by Messrs. Sutcliffe, Speakman & Co., Ltd. It has a capacity of 2½ million cu.ft. of gas per day, and is capable of giving an efficiency of over 99% of recovery of benzole. The plant, which is sited between the purifiers and the station meter, and is contained within a brick building, consists of: Absorber (in duplicate), vertical gas cooler, horizontal condenser for benzole vapours; spirit separator, test tank, and storage tank; heater for recirculated gas; control box and valve gear, gas recirculating fan and air compressor, actuated by 4-h.p. electric motor; pump and loading column to load spirit; panel switchboard; and water tower with circulating pump to treat water from cooler and condenser.

A feature of the plant is that it is entirely automatically controlled; this is a recent development, as previously activated-carbon plants required the constant presence of an attendant.

The process relies on the adsorption from the gas of its benzole content by activated carbon. When the carbon is thoroughly saturated with benzole, the gas flow into the adsorber is stopped (being automatically diverted into a second adsorber provided to maintain continuity of process); the carbon is cleansed of the adsorbed benzole by the introduction of open steam; the benzole and steam vapours are condensed, and the condensates pass to a separator from which the benzole spirit flows to a test tank and then on to a storage tank; after cleansing, the carbon is dried and cooled; it is then ready for the next adsorption period. While one adsorber is adsorbing, the other adsorber is being steamed and dried.

In any complete cycle, the steaming/cleansing period is the same as the drying/cooling period, and these two periods together equal the period of adsorption. The maximum period for adsorption within one adsorber is one hour; the maximum steaming/cleansing period is half an hour, and the maximum drying/cooling period is half an hour. When the carbon is becoming spent, the complete cycle may be shortened at will.

The life of the carbon is normally about three months, after which time it may be re-activated by the makers. Each adsorber contains approximately 1,900 lb. of carbon.

The operation of the plant is, briefly: A double ring of stainless metal screens, reaching from the bottom to the top of the adsorber, contains the carbon bed, which has a horizontal thickness of 10 in.; the gas passes through the carbon from the outer to the inner annulus, and then flows in a downward direction to the outlet of the adsorber, onward to the gas cooler, and then into the main gas stream to the station meter. It is claimed that the passage of the gas horizontally through a relatively small thickness of bed, but over a large superficial area, results in the minimum of back pressure and the maximum of life of the carbon. In the cleansing period the steam admitted into the adsorber passes through the carbon in the reverse direction—that is, from the inner to the outer annulus. The benzole and steam vapours pass to the horizontal condenser, and the condensates flow to the separator; incondensible gases are vented back into the other adsorber.

The carbon is further conditioned for the next period of adsorption by drying/cooling; this is effected by passing a certain amount of the stripped gas, by means of a circulating fan, through a small gas heater (steam heated) into the adsorber and through the carbon.

Automatic control of plant is effected by a control box mechanism, and by spring loaded valves. The gas valves are spring loaded to open, and are closed by the inflation of rubber diaphragms with air from a small air compressor giving a pressure of about 10 lb. per sq.in. The valves are mushroom type; the valve plate joints up to a semi-metallic renewable jointing ring, as opposed to metal to metal seating. There are three gas valves on each adsorber; the top valve is for the purpose of recirculating stripped gas to dry the carbon after steaming; the middle valve is the inlet gas valve; and the bottom valve is the outlet gas valve. When adsorbing, the inlet and outlet gas valves only are open. When steaming, all three gas valves are closed. When drying/cooling with stripped gas, the top (recirculating) gas valve and the outlet gas valve are open, and inlet gas valve is closed. Unstripped gas is allowed to pass into the steamed and dried adsorber before the gas valves on the other adsorber are closed; the valve mechanism is so arranged that at no period can all the gas valves be closed. Should the control mechanism and/or the air pressure fail, all the gas valves would automatically open. The valve on the steam pipe to the adsorber is also spring loaded and is interlocked with the gas outlet valve.

The valve mechanism is operated through an automatic control box, which contains a series of cams mounted on a shaft, the speed of which is variable in accordance with the time cycle required. The cams operate in correct sequence, and small pilot valves—fixed on the outside of the cam box—allow air to pass into, or to exhaust from, the diaphragms. The control box is so arranged that the duration of the cycle can be varied downwards from the maximum already stated. This provision is necessary, since the carbon loses its adsorption capacity the more it becomes "spent." Were the cycle not shortened in accordance with the reduced activity of the carbon, reduced gas stripping would ensue. The control box is filled with oil; wear and tear is negligible, and no attention is required.

An electric motor (4 h.p. flameproof type) is the prime mover of the control box; it also drives the air compressor, gas recirculating fan, and water circulating pump. Steam requirements for the plant are in the neighbourhood of 40 lb. per gallon of benzole recovered. When the carbon is new, less steam is required; when the carbon is becoming "spent," more steam is required. This latter amount is one of the factors determining the replacement of the carbon. Carbon replacement usually costs about ½d. per gallon of benzole recovered. Water consumption, by virtue of the water cooling tower, is practically *nil*. The spirit is water white. Provided there is full benzole recovery from the gas, the highest possible benzole test is obtained, the gas is left with a sulphur content of under 10 grains, and there is a total extraction of naphthalene.

Maxol Heaters, Ltd., of Manchester, have appointed as their agent Messrs. Wm. Stevenson & Co. (Lead), Ltd., Glasgow, C. 2, for the sale of their water heaters and boilers in Scotland, Ireland, and some districts of the North of England.

Labour Saving Houses have been erected in the first new town—known as the Million Pound Town—in the West Midlands. Cooking is done by gas in over 75% of the houses, though the living rooms are fitted with combination grates having back boilers to provide hot water. There are gas coppers in all the houses.

The Bristol Engineering Manufacturers' Association (Hon. Gen. Sec: J. E. Evans) would be glad to receive copies of publications issued by firms and organizations. These are added to the Association's Library and made available to members (140 engineering firms), and are particularly useful where they contain technical information on processes, heat treatments, raw materials and new products, &c. Details of all publications received are circulated monthly to members.

Much New Material has become available since the publication in 1939 of the 15th edition of Redgrave and Owner's *Factories, Truck, and Shops Acts*, and to bring the work completely up to date Messrs. Butterworth & Co. (Publishers), Ltd., have therefore published the *First Supplement to the Fifteenth Edition* (7s. 6d. plus postage). The first part of the Supplement notes all the new information since 1939, and the second part sets out *in extenso* all the additional Acts and Rules passed since that time. Careful cross-references are given to facilitate ready reference to new matter relevant to the contents of the main volume.

Sir Frederick West presented on Sept. 30 two gold watches and nine long service certificates to members of the staff of West's Gas Improvement Company, Ltd., Manchester. Mr. Newton Fletcher, Chief Foreman Fitter, and Mr. C. Frederick Smith, Chief Maintenance Fitter, received gold watches in token of 40 years' service with the Company. Long service certificates mark 25 years' service, and among the recipients of these was Mrs. Butterworth, the first woman to receive the certificate, who was Forewoman in the Mines Department during the last war and has since been manageress of the Works Canteen. Two other certificates have been issued during the year to Messrs. A. Jones and J. Johnson, who are serving with the Company in Australasia.

The Colonial Gas Association, Ltd., reporting on operations during the year ended June 30, state that the net profit amounts to £84,960, after providing for taxation the sum of £55,000. After adding to the net profit the balance brought forward from last year and deducting the interim dividend paid in April last, amounting to £41,605, there is a balance at credit of the net revenue account of £47,207. The following dividends have been declared: 8% per annum (Australian currency) on the Preference Shares (less interim dividend of 4% paid in April); 5% per annum (Australian currency) on the Ordinary Shares (less interim dividend of 2½% paid in April).

With such a wealth of fruit and vegetables displayed at the great Horticultural Show which was held in the Cambridge Corn Exchange on Sept. 22 and 23, it was fitting that space should be allotted for demonstrations in bottling and other means of preservation. In matters of this kind the Cambridge University and Town Gas Light Company has always been prominent, and on this occasion co-operated with the Ministry of Food, the County War Agricultural Committee, and the Electricity Company, at a Bureau where problems were dealt with and demonstrations in cookery and bottling given at frequent intervals. The Gas Company's demonstrator had a busy time and the dishes prepared evidently proved very popular, as the number of recipes distributed exceeded 1,700.

Hull Corporation held a Town Planning Exhibition from Sept. 1 to 18 which was attended by nearly 24,000 people, including the members of a conference held by the Town and Country Planning Association on Sept. 4. The chief exhibit was a Region Survey of the City of Hull made in connexion with the Leverhulme Trust, with assistance from the B.C.G.A. This survey is to form the basis of the replanning and reconstruction of Hull, which is now being considered by Professor Abercrombie and Sir Edward Lutyens, who have been engaged by the Hull Corporation to advise them on that work. Messrs. Cadbury had a fine exhibit on Town Planning, and the East Hull Gas Company had a mural exhibit of "To-morrow's Kitchen." This, by permission of the Newcastle and Gateshead Gas Company, was based on their recent exhibit, and prepared for the East Hull Company by the British Commercial Gas Association. The exhibit attracted considerable attention, and in particular the examples of "built-in" refrigerator and eye-level cooker were found interesting.

CARBONIZING PLANT PROBLEMS*

MR. S. E. **Whitehead** (Southampton) said they would all sympathize with the Author for having to tackle such a big job of reconstruction on a congested site in war-time. He had been most impressed with the illustrations given, particularly of the close attention to details, such as wide doors and other facilities for handling machinery. It was a real engineer's job and a pattern for them all. It was typical of the Author that the Paper was so thorough and complete that there was very little one could criticize, but one or two questions occurred to him on which he would like further information.

In the first place, he would like to know the Author's reason for deciding to modernize his horizontal house instead of extending his vertical retorts. There might be several answers to this question, such as choice of coal, wartime restrictions, or the possibility that the Author had not sufficient capacity to release a large proportion of his plant. In regard to the Fleuve system of coke handling, he was particularly interested in this, which had attracted him ever since he saw the Maidstone installation some years ago. He had been hoping to adopt this system in a house of 25 beds at Southampton, but two difficulties had prevented it. One was the impossibility of securing sufficient depth for the trough, allowing for the necessary fall from one end to the other. The other was the necessity of making a right-angled turn in the trough, in order to bring the coke out of the house. It was feared that this would cause serious breakage of the coke and erosion of the trough, but he noted the Author had such a right-angled turn, and he would like to know if any trouble was experienced in this connexion.

Another point on which he was doubtful was the percentage of moisture in the coke. Had the Author any details of this?

Finally, he would be glad to know if the " box tee" retort house ventilator had been patented, because, if not, he intended to try one out as soon as possible, since it seemed very good.

The Author, in regard to the modernizing of the horizontal house instead of extending the verticals, said there were several reasons for this, and they were all related. The chief object was to increase the capacity of the house, which was a useful and substantial part of the gas-making plant. Then there was the question of space, and the certainty that sooner or later the verticals would have to be extended if the output increased beyond the capacity of the combined horizontal and vertical load. Vertical extensions were, therefore, only postponed. Another reason was that they were by no means wedded to the continuous vertical system in preference to horizontals. From the purely "cost" point of view, monthly calculations involving the cost of all raw materials and labour, less the return from residuals, showed that there was very little in it, the answers being calculated as "net cost per therm made."

The depth of the Fleuve trough from stage floor level to the floor of the blue brick lining was approximately 1 ft. 2 in. at the water inlet ends, deepening to approximately 2 ft. 6 in. on the outlet leg between the steam chimney and the receiving hopper. From the depth of trough point of view, and the headroom in the basement, it was an advantage to leave the house at a junction somewhere between the beds being served, as it permitted the trough to fall from both ends, instead of falling the whole length of the house in one direction.

The right-angled turn in the trough was quite satisfactory, providing they designed the bends with an easy radius. His was a 7 ft. radius, and he would not recommend anything sharper. If space and other conditions allowed it, the easier the radius the better.

There was no trouble with breakage of coke at the junction, and no erosion of the trough, providing the shaped blue tiles were taken high enough—*i.e.*, above the natural water line.

With regard to moisture in the coke, it must be remembered that owing to the lay-out, and the short outlet leg, the time contact of the coke with the water flowing at 12 ft. per second was very short. So short in fact that an auxiliary spray had to be fitted over the receiving hopper. The trough quenching alone was insufficient. The moisture content of the coke leaving the trough was under 4%.

The box tee ventilators were not patented. They were mentioned in the Paper so that members could benefit from an article which was really very efficient, yet very cheap.

Mr. **W. A. Howie** (Maidstone) said his plant at Maidstone comprised 18 beds of horizontal retorts, Le Fleuve conveyor, and coke handling and screening plant, and thanks to the work of his predecessor, Mr. Hornby, who successfully carried out renewal of condensers, washers, scrubbers, and purifiers, and installed benzole plant nearly 10 years ago, his only concern to-day was the modernization of the horizontal carbonizing plant. For peace of mind and ease of working, he was a great believer in modern horizontal retorts for medium sized works, and from a fuel efficiency point of view, it appeared to him they wanted a lot of beating.

From his present experience as a member of the Gas Engineering Advisory Board of No. 12 Region, he had been particularly struck by the remarkable fuel expenditure index figures obtaining at medium sized works operating good horizontal retorts. It would appear to him from a fuel efficiency point of view so far as horizontals are concerned, that the best way was to work the horizontal plant as much as possible, dilute with producer gas, and only use C.W.G. or B.W.G. plants as "make-up" for winter or peak loads.

He agreed with the Author when he expressed the view that, generally speaking, visits to other works, scrutiny of the Technical Press and attendance at Institution and District Association meetings would in course of time determine whether an engineer was in possession of obsolescent plant. He thought that many engineers present would like to bring their carbonizing plants up-to-date now, if it were possible.

He was rather amused at the Author's remarks that a works with only one charging machine caused anxiety. This might have been so in years gone by, but his experience was that the modern charging machine was very reliable, and providing the engineer ensured that he had in stock a spare electric motor, which could easily be substituted for the faulty one, there should not be undue anxiety.

The Author was fortunate in being able to wash, scrub and meter coal gas and water gas separately. He thought this ideal, particularly so far as benzole extraction was concerned.

He did not think that "mixed" gas (*i.e.* coal gas and water gas) should be passed through the benzole washer; better results and more efficient working should be obtained from the coal gas alone.

He congratulated the Author on deciding to install the waste heat boiler outside the retort house in a house specially built for the purpose; it was a wise decision.

He was much interested in the fact that the Author decided to re-use the existing Braddock type governors (after overhaul), and he mentioned that there were other types of governor on the market which were supposed to give finer control, and he wondered whether the later type of governor could establish a superiority over the older type from the point of view of therm production. He had the same problem at Maidstone, and had ordered Bryan Donkin retort house governors because he was informed that they would not "shunt" (*i.e.*, the one working against the other), as had been experienced at some works with the bell type of governor.

He would suggest to the Author that in view of the conditions of working in the retort house he filled the retort house governor tanks with oil, such as gas oil, instead of water. He was glad the Author decided to install Cort's anti-dip pipes, because he installed these pipes at Gravesend several years ago, and in consequence of being able to work the settings at almost level gauge to produce 500 B.Th.U. gas, diluted with producer gas, he found that the ascension pipes, bridge pipes and the inside of the retort doors were always "oily" and a stopped pipe was unknown. He found that it was necessary to oil regularly with waste oil the mechanism of the anti-dip valve—say once every week.

He was installing Cort's anti-dips at Maidstone, and felt sure that his trouble of stopped pipes will be cured. He agreed with Mr. G. M. Gill that there should not be any seal between the retort and the foul main.

In regard to coke handling, he envied the Author's new plant, comprising the latest form of Le Fleuve conveyor and automatic skip hoist for elevating the coke to the screening plant. It worked perfectly and quietly compared with the drainage conveyor and bucket elevator as at Maidstone. The Maidstone Le Fleuve system was introduced many years ago, and if he could substitute the static screen and skip hoist for the drainage conveyor and bucket elevator, a considerable reduction in "breeze made per ton" would be effected. He felt sure that the yearly maintenance costs of coke handling from retort house to the overhead coke bunkers and screens at Hampton Court would be very small indeed.

Finally he would like to ask the Author:

(1) What weight of coal per charge is obtained in the 23 in. by 16 in. by 20 ft. retorts?

(2) Has any appreciable saving of fuel in the producers been effected since the introduction of step grates?

(3) What extra "therms per ton of coal," if any, have been produced since the introduction of Cort's anti-dips?

(4) How many stokers are employed per shift other than firemen, when working 16 beds?

(5) Does the waste heat boiler attached to the horizontal plant provide all works steam requirements?

The Author replied: The first point I should like to make on Mr. Howie's remarks is to underline the importance of having two charging machines for a house of say 16 beds of retorts. It is true that spare parts can be accumulated, even to the extent of providing spare motors. But it is not always the motor which is subject to breakdown. I can recollect a mishap to a machine taking 18 hours to repair, even with an efficient maintenance staff. Hence the statement with regard to "anxiety." Any breakdown to a charger which involves cessation of manufacture is an anxiety, and can be avoided by the provision of a spare machine.

Taking Mr. Howie's questions in their order:

(1) The weight of the Durham unscreened coal in the 23 in. by 16 in. by 20 ft. retorts by the use of the "M" head is 15 cwt.

(2) At present we have no actual weights to give in respect of the saving of fuel by the adoption of the latest type step-grate, but we know they are economical, and as we have increased the output of the

* Discussion on Paper to the Southern Association of Gas Engineers and Managers (Eastern District)—see "JOURNAL" of Aug. 11, p. 175.

house by 20%, it follows that the fuel per ton of coal carbonized is correspondingly less.

(3) The extra therms per ton of coal obtained by the use of Cort's anti-dips can reliably be placed at two.

(4) The number of stokers employed per shift excluding the machine man, for beds up to 9, is three, one acting as lidman on the machine side, and two on the discharging side. These three men change their respective jobs in turn, either per draw or per shift. They also carry out the full duties of fireman for the full number of beds in use. After 9 beds and including 12 beds, another man is attached to each shift.

(5) With regard to the waste heat boiler steam, assuming the horizontal house in full commission, this boiler working in parallel with the vertical retort house waste heat boiler will provide all the steam required on the works, with the exception of the water gas plant. This latter plant is equipped with its own Lancashire boiler.

Mr. **C. A. Deas** (Southgate) said that Mr. Whitehead had made reference to the possibility of difficulty of the 90° bend in the conveyor. It might be of interest to state that at Southgate the conveyor had a 180° bend. The Author had certainly brought light to bear upon an important point when he stated: "Our experiences suggest that manufacturers do not appear to employ sufficient technical representatives with sufficient qualifications, to follow up their plants with the object of collaborating with gas engineers and seeking improvements, particularly so with regard to horizontal retorts."

Vertical retort practice, continued Mr. Deas, had undoubtedly reached its present high state of technical control by such collaboration, and horizontal retort practice would undoubtedly benefit under similar conditions. He would suggest that properly worked horizontal houses, provided with modern mechanical plant and appurtenances, could give results, both technical and financial, comparing quite favourably with vertical retorts, with the added advantage of greater flexibility, and the ability to handle practically any class of coal. The Author used 7-in. ascension pipes, and he would like to know whether he considered there was any advantage in this size pipe over a 6-in. pipe.

The practice of filtering the water to the furnaces had much to recommend it. It avoided overheating of the furnaces, due to water easing up, or alternatively, waste of water, owing to the fireman leaving more water on the furnaces than necessary, in order to ensure that overheating did not take place.

Referring to the Fleuve conveyor, it might be of interest to state that the conveyor at Southgate was exactly similar to that now installed at the Author's works, and after 2½ years of use, no appreciable wear of the lining tiles was discernible. Similarly, with the pumping units, after 2½ years' service, they were running as well as when first installed, and except for occasional repacking of the glands, no repairs or renewals had been necessary.

He was interested to read of the Author's difficulties with the settling pits. His experience confirmed that a considerable quantity of fine breeze did pass forward from the first pit, in which all the breeze was supposed to settle out, and he would suggest for future plants that three pits were necessary, one to retain the larger breeze particles, the second pit for the fine breeze, and a third pit to act as a suction pit. Actually this was the system they had in use at Southgate, and they found that it was rarely necessary to clear the suction pit.

Referring to the new "M" type pusher head, he would like the Author's definition of a "beautiful charge," also the time taken to empty and recharge each retort—*i.e.*, door to door—the number of "shots," weight of charge, and the carbonizing period.

He saw no advantage in leaving a gas way over the charge. It would appear to be a waste of retort capacity. If it was intended to allow the gas to escape from the centre of the charge, then he would point out that no similar gas-way was provided, or for that matter possible, in vertical retort practice, where one had a fuller charge probably more tightly packed than was possible in horizontal practice.

He would suggest that the best all-round conditions were obtained by completely filling retorts, making due allowance for heavy swelling coals, such as Durham.

The Author's method of improved ventilation was extremely interesting, and he considered that insufficient attention had been paid to this point in the design of retort houses, particularly horizontal. Surely this was a matter which should receive as much consideration as the design and lay-out of the house, and if black-out conditions had focused attention on this point, retort house workers at least would not look upon it as an altogether unmixed evil.

A properly ventilated house would more than repay the time and expense involved, by a more contented staff, resulting in better work.

Could the Author give any figures as to the moisture content of the coke since the installation of the Fleuve conveyor? His experience with a similar conveyor was that No. 1 size could be too dry, but it was difficult to avoid over-wetting of the smaller sizes, particularly No. 3. Over the whole of last year, tests of his No. 1 size coke averaged 4% water, but No. 3 size averaged 14%, with occasional tests running up to 18%.

Had the Author any difficulties with fires in his coke hoppers? His experience was that if immediately after leaving the Fleuve conveyor, coke was sized before being stored in the hoppers, no trouble occurred, but if immediately after leaving the conveyor it was stored unsized, the likelihood of its firing up was very great.

The Author: With regard to the use of 7-in. ascension pipes, one must bear in mind that the original pipes on the charging side were 8 in. in diameter, and from the point of view of balance, we should have installed 8-in. pipes on the discharging side but for the practical difficulties involved. There was no particular point in using pipes in excess of 6 in. other than the object of making sure the gases were automatically and evenly passed to the hydraulics on both sides of the house. Referring to the "M" head, the "beautiful" charges are so named by the stokers when the burnt off charges leave the retorts and conform to the shape and size of the retort itself, without valleys or humps.

With regard to the time taken to empty and charge one retort with the "M" head, it takes approximately 20 seconds to push out the charge when not firing up, and between 2 minutes and 2½ minutes to re-charge it when using 5 shots. This includes the time occupied in operating the "plough." I should estimate that it would take 4 minutes to complete the whole operation from door to door. The weight of the charge was 15 cwt., but knowing Mr. Deas' reputation for really full charges, more than 15 cwt. could be charged; and it was done in this way. The first shot was placed 3 ft. from the discharging mouthpiece, and then the second shot and the first shot combined are pushed together to the iron of the discharging mouthpiece. It is then possible to use a total of six shots, with a corresponding increase in the weight of the charge. I should estimate that it is possible to obtain a 16 cwt. charge by adopting this method. One has to remember, however, that more time or more heat will be required to burn off the charge completely, but there is no difficulty about this if silica segmental retorts are used.

Mr. Deas prefers to leave no gas-way over the top of the charge. At the moment I have an open mind on the subject, because the conditions obtaining in horizontal retorts are not precisely the same as with verticals. It seems to me that, with pressure conditions inside the retort, the gases would have more difficulty in percolating through a dense charge than across the top of the charge via the small gas-way as moulded by the plough.

With regard to moisture, I agree that the moisture content of the coke is greater in the smaller sizes. That is due to the easy and complete quenching of the smaller pieces during their immersion and travel in the trough. We have not had any trouble with fires in the coke hoppers, and this is due partly to the secondary quenching in the receiving hopper, and partly to the fact that only graded coke is stored.

I note that Mr. Deas is fortunate in having two breeze pits, with the object of preventing the fine from reaching the suction pit in any appreciable quantity. I feel quite sure that much more attention must be paid to the design of settling tanks, and more data must be collected, so that the problem can be tackled in the proper way after a survey of the factors to be dealt with, such as turbulence, velocity of the water over the return weirs, &c. I feel that up to the present, some of the designs have been nothing more than guesswork, and if good filtration was obtained, it was to a certain extent a fluke. Ground space has quite an appreciable influence on the lay-out and resulting efficiency.

Mr. **G. L. Braidwood** (Gas Light & Coke Company): Mention has been made in this discussion of the desirability of filtering the water to the furnaces in the retort house. I would add that it is also very desirable that the water should be supplied at a regular pressure, since it is otherwise liable to considerable variations due to the intermittent use of other services coming from the same source of supply, as, for instance, quenching water. A constant pressure can be satisfactorily supplied by the use of an overhead tank. The Author has queried whether the newer types of governor are really more effective than the more old fashioned, such as the water sealed bell type. I should answer that in general terms they are, but the older type can be made to give good results when kept clean and as free from friction as possible; the impulse pipe should be of ample size and as short and as free from sharp bends as possible. In a horizontal house, improved results may be obtained by moving the governor to the top and at the centre of the section of beds of retorts from a position on the charging stage, where it is considerably further away from the retorts, although it will be more subject to dust, &c., in the new position, and steps must be taken to protect it.

As regards the Fleuve type of conveyor, I have in the past had experience with both the concrete and cast-iron type, and in both cases the duration of life has been very substantial. In these cases there was a Y off-take from the fronts of the settings, the length of run on one side being approximately 200 ft., and on the other about 100 ft.; the right-angle bends did not show undue wear. The moisture content of the coke from the Fleuve conveyor is low, and may well be lower than when the coke is spray quenched. The reason for this is, I think it is generally agreed, that the red-hot coke on falling into the water rapidly evolves steam, which forms a cushion and so prevents further penetration of water.

The Author said he agreed that a constant head of water was necessary for the furnace water feed, and he omitted to mention the fact that a special tank had been erected over the beds for this specific purpose. His remarks in connexion with the retort house governors appeared to have been misunderstood. The governors themselves were placed in the usual position above the settings, but the control was effected from the stage floor. To the small circular disc carrying the weights was attached a wire bond, and this bond was taken to the stage floor through a series of pulleys and pegged to a quadrant. Each alteration of the peg varied the vacuum or pressure by approxi-

mately one-hundredth of an inch. That was what he meant by stage floor control.

Dr. **S. Pexton** (Gas Light & Coke Company): My only reason for speaking to-day is to comment upon the choice of horizontal retorts *versus* continuous vertical retorts. The continuous vertical retort system is inherently more efficient thermally than is any system of static carbonization, because the sensible heat of the hot coke discharged from a static system, about 11 therms per ton of coal, supplied with an efficiency of about 60%, results in a loss of 18 therms of fuel per ton of coal. It has been suggested that works with continuous vertical retorts show no overall advantage compared with works having horizontal retorts. May I suggest that much of the advantage of continuous vertical retorts is lost in commercial returns of the results, because the average moisture content of the coke from most static plants is very appreciably higher than from continuous vertical retorts.

I fully recognize that the thermal yield of gas from continuous retorts is often not so high per ton of coal as from static plants—*i.e.*, more coal has to be processed by the continuous system per unit number of therms of gas sold at a given calorific value and with given inert content in the gas distributed. This, however, is more than compensated for by the fact that the weight of coal, minus the saleable yield of coke and breeze (at standard moisture content) per unit of gas of standard calorific value and inert content, is appreciably less for works with continuous vertical retorts than for works with any of the various forms of static plant.

A further point that cannot be too strongly emphasized is: When we lay down carbonization plant we commit ourselves for at least 15 years, usually considerably longer. It is, therefore, most important that our minds shall not be too fixed by existing standards, but we must always assess what are the potential improvements within sight with any particular system. To-day, these seem to be greater with the continuous system than with static systems. This applies not only thermally, but also from the point of view of amenities, and from the point of view of saleability of coke, which latter feature has such an important economic effect upon the process.

Mr. **Thorman** (Gas Light & Coke Company) asked the Author the duration of the carbonizing period, and whether he had gone in for recirculation, and the temperature of combustion chambers?

Mr. **C. T. Price**: The charges are of 12-hour duration, and we have not yet gone in for recirculation. The temperature of the combustion chambers runs between 1350°C and 1400°C.

A vote of thanks to the Author was proposed by Mr. **J. H. Dyde** (Uxbridge), and seconded by Mr. **G. L. Braidwood.**

RATIONAL PREPARATION OF COAL*

By R. LESSING

THE supply of energy is one of the most important fundamentals of our social, economic and industrial life, and it is not surprising that many minds are bent upon planning its reorganization even while every effort is needed in the prosecution of the war. Much of this activity is directed towards the consideration of the relative merits of solid fuel, gas, and electricity, and of the forms and conditions in which these are to be supplied and used. In the elaboration of their plans the protagonists of the various systems exercise much vision and in some cases propose quite revolutionary changes, but they all seem to base their schemes on the provision of coal in its traditional forms. The purpose of this Paper is to show that a planned organization of the coal-producing and using industries of the future must see in coal, as it is found in the earth and mined, a raw material and not a finished product. This consideration must guide every step on the way from the coal seam through all the stages of underground work, raising to the surface, preparation, distribution, storage, conversion by thermal or chemical processes, to the final utilization by combustion of coal itself or its products. The scheme visualizes the effective physical subdivision of the bulk of the coal output of this country into such characteristic components as will best suit the various major uses, with the object of promoting the technical efficiency of these processes and of ensuring the most economical use of our coal resources.

Coal is not a uniform substance but a complex mixture of many entities, each conforming to a more or less definite type. For practical purposes four readily recognizable components (or groups of entities) may be distinguished in commercial coal: bright coal, dull coal, natural coal dust, and mineral matter. These components may be briefly defined by the following properties:

(*a*) Bright coal when heated has a more or less pronounced tendency to caking and possibly swelling. A coal containing an adequate proportion of the suitable bright component is therefore used for coke-making in gas-works or coke ovens.

(*b*) Dull coal is usually non-caking or feebly caking, is harder and less breakable than bright coal. A coal rich in this variety is most suitable as fuel for boiler and other furnaces.

(*c*) Natural coal dust is a very friable material, much of which has charcoal-like properties. It is present in small quantity only, say up to 5% of the whole seam, and is the only component of coal which soils the fingers; as it is dispersed throughout the seam in thin veins and lenticles, it imparts "sootiness" and dustiness to the whole mass despite its very small proportion. A coal freed from it by efficient dedusting is almost non-soiling and dustless.

(*d*) The mineral matter in commercial coal consists mainly of shale, pyrites ("brasses"), lime and iron compounds which are similar to boiler scale, being the residue of calcareous or chalybeate water that has percolated through the seam, and other adventitious impurities. These substances are non-combustible (except that portion of shale which is more or less carbonaceous), and their residues form the bulk of the ash left behind when coal or coke is completely burned. Only a small portion of the ash is derived from the inorganic constituents of the plants from which the coal originated.

A large proportion of these impurities is loosely attached to the coal substance, and in the course of mining and handling they become detached. Therefore, in slack or duff practically all the mineral matter is discrete and the coal with which it is mixed is usually even purer than the large coal of commerce, which may still contain dirt lenticles or veins within the lump.

The time has come when attention should be devoted to the disentanglement of the raw material upon which most of the energy supply of modern life depends. Great progress has been made in fuel technology, but most of this has been in the direction of improving appliances and fitting them to the available coal, while relatively little has been done in supplying fuels capable of rendering the work of the consuming plant easier and as efficient as possible.

An attempt is made in the Paper to indicate the direction in which such work should proceed. In the main, these proposals comprise the extraction underground and raising to the surface of all material containing combustible matter, the complete removal from it of the mechanically separable mineral matter, and its physical subdivision into the three main components, bright coal, dull coal, and natural dust. No novelty is claimed for these proposals; they are substantially identical with those outlined in evidence given to the Royal Commission on the Coal Industry (1925), and while they were never dealt with as a comprehensive whole, their individual features have been discussed, investigated, and practised in the intervening period.

The tendency until the beginning of this century was to produce large or "round" coal; the inherent reason for this was not a preference for size, but the unconscious realization that the lumps which had remained unbroken had a low ash content. We now know that many of the mineral impurities form lines of mechanical weakness along which coal breaks when subjected to impact. Hence the concentration of mineral dirt in the nut and slack sizes.

The fact that mineral matter and coal are present as, or can be broken to, discrete particles makes their separation possible, and forms the basis of all coal-cleaning processes. Shotfiring and mechanization in mining tend to make more small coal. Thus, the bond between coal and dirt of a correspondingly greater proportion of the output is broken and its cleaning is facilitated.

When recovery or "Patent" coke ovens were introduced their economy was based on the ample supply of cheap nuts and slack, which commanded a much lower price than round coal. However, to make the coke acceptable by the iron industry, at least a portion of the dirt in the small coal had to be eliminated. The foreign pioneers of the new coking system recognized this, and installed coal washeries in conjunction with coke ovens. During 45 years coal washing has certainly progressed, but at an extremely slow rate, as regards both the tonnage dealt with and the precision and efficiency of separation attained.

I proposed in 1925 the term "clean coal" for a product of limited density, and containing a minimum of separable mineral matter as distinct from "washed" coal still containing part of the contaminating substances. The limitations of water washing and pneumatic treatment led to the application of gravity separation by means of media heavier than water. In 1928 I submitted to the Institute of Fuel a Paper on "The Rational Cleaning of Coal," in which gravity separation as used in the first commercial plant in this country was described. In devising that process it was recognized that thorough dedusting is an essential prerequisite of all good coal cleaning. By this is meant the extraction from the coal before cleaning of practically all dust of less than about 1/100 in. diameter particle size, leaving even in small slack no more than 1%. Apparatus for this operation was designed, and a considerable number of these and similar plants have been in satisfactory operation for some time in this country and abroad. In the past, only slack has been submitted to dedusting. The present scheme contemplates cleaning of all raw coal raised from the pit regardless of size. Apart from the marked reduction during recent years in the size of industrial coal, there is now a definite tendency towards limiting the upper dimension of all coal to 2 in. or 4 in. The present proposal therefore comprises the crushing of all coal extracted from the pit on arrival at the surface or at the preparation plant to say 4 in. or less, possibly after roughly screening out the portion below that size, with a secondary removal of slack. Screening and crushing should be carried out in closed plant fitted with efficient dust extraction, while the slack will be passed through a dedusting plant proper. This procedure eliminates such fusain and other potential dust-forming matter from large coal as would be liable to be released by subsequent handling and breakage, possibly at the consumer's end.

(*To be continued*)

* From a Paper to the Institute of Fuel, Sept. 30.

Gas Products Prices

The London Market Oct. 4.

All Coal Tar Products are in good demand, and Pitch in the London area remains about 45s.

An Order entitled The Control of Toluene (No. 3) Order, 1943 (S. R. & O. 1943, No. 976), came into force on July 20, and introduced certain changes in the prices for different grades of Toluene.

There are no changes to report in the prices of Coal Tar Products, but attention is called to the new Order, which has just been issued, the Control of Coal Tar Order, 1943 (S. R. & O. 1943, No. 1356).

The Provinces Oct. 4.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 11d., pure, 2s. 7½d. (controlled by the Control of Toluene No. 3 Order, 1943, dated July 14, operative from July 20, 1943). Naphtha and Xylole controlled by the Coal Tar Naphtha and Xylole Order, 1943, dated May 31 (S. R. & O., 1943, No. 768), operative from June 1. Carbolic acid, 60's, naphthalene, and anthracene controlled by the Coal Tar Products Prices Order S. R. & O. 2509, dated Dec. 7, 1942, and operative from Jan. 1, 1943. Filtered heavy oil (min. gr. 1,080), 7½d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5½d.; timber preservation and other purposes 4½d. to 6d.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland Oct. 2.

Steady throughput is maintained. Refined tar controlled. Value is 4½d. per gallon *ex* Works, naked. Creosote oil: Specification oil, 6½d. to 7d.; low gravity, 7½d. to 7½d.; neutral oil, 6d. to 6½d.; hydrogenation oil, 5¾d. per gallon; all *ex* Works in bulk. Refined cresylic acid is readily sold for export as available at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha: 6½d. to 7d. per gallon. Solvent naphtha: Basic prices delivered in bulk, 90/160 grade, 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 3d. per gallon. Pyridine, 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

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GAS STOCKS AND SHARES

The stock markets were firm in tone throughout the whole of last week. British Funds showed all-round strength towards the close, while several groups of industrials also displayed a hardening tendency.

In contrast to the more cheerful atmosphere in other sections the Gas Market was dull. There was less activity, and a number of debenture issues closed two or three points lower. Compared with a month ago the few price changes in ordinary stocks have been mostly upwards, Alliance and Dublin and Cardiff being strong features, and it was not until this last week that any downward tendency among debenture stocks occurred.

The list of ordinary stocks available remains small, but among these the following may be of interest: £1,570 Bristol 5% maximum at 116 yielding £4 6s. %, and £5,000 United Kingdom Gas Corporation £1 shares at 22s. 9d. to give a return of £4 8s.%. Only a very few small parcels of preference stock are available, the exception being £5,000 Gas Light at 3½% at 96½ yielding £3 19s. after allowing for redemption, while a long list of debenture stocks are on offer, giving yields of between 3½% and 4½%.

Particulars of a new Gas Corporation which has been registered under the title of the Greater South London Gas Corporation appear elsewhere in this issue.

The following quotations were changed during the week:

OFFICIAL LIST

Associated Gas & Water Ord. ...	20/9—21/9	+-/3d.
Ditto Deferred...	20/9—21/9	+-/3d.
Bombay	23/6—25/6	+-/6d.
Colonial Gas Association Ord. (x.d.)	½—¾	Sept. 27
Ditto 8 p.c. Pref. (x.d.)	⅝—¾	"
Croydon 5 p.c. Deb.	120—125	−2
East Surrey 5 p.c. Deb.	118—123	−3
Gas Light 4 p.c. Pref....	94—97	+1
Ditto 3½ p.c. Red. Pref.	93—96	−1
South Metropolitan 6 p.c. Pref. ..	125—130	−1
South Suburban 5 p.c. Deb.	120—125	−2
Tottenham 4 p.c. Deb.	99—104	−3
Wandsworth 5 p.c. Deb.	120—125	−2
Ditto 4 p.c. Deb.	99—104	−2

SUPPLEMENTARY LIST

Bristol 4 p.c. New Deb.	97—102	−3
Romford 4 p.c. Deb. (x.d.)	95—100	Sept. 30

Quotations on the London and Provincial Stock Exchanges

OFFICIAL LIST

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Sept. 30
1,767,439	Sept. 6	—	2	Alliance & Dublin Ord. ...	100—110
374 000	June 28	4	4	Do. 4 p.c. Deb.	95—100
583,407	May 10	5	5	Asscd. Gas & Water U'd'ts Ord.	20/9—21/9
388,938	"	—	—	Do. Deferred	20/9—21/9
500.000	"	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/3—20/3
535,545	"	4	4	Do. 4 p.c. Red. Cum Pref.	19/6—20/6
341,966	"	4	4	Do. 4 p.c. Irred. Cum. Pref.	17/6—18/6
561,370	Aug. 16	7	7	Barnet Ord. 7 p.c.	153—158
300,000	June 15	1/4½	1/9⅝	Bombay, Ltd.	23/6—25/6
690,407	Aug. 16	7	7	Bournemouth 7 p.c. max. ...	150—155
362,025	June 15	4	4	Do. 4 p.c. Deb. ...	105—110
659,955	Sept. 6	2½	2½	Brighton, &c., 5 p.c. Con. ...	88—93
855,000	" 13	6	6	Brit. Gas Light Ord.	108—113
545,000	June 28	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115
120,000	" 15	4	4	Do. 4 p.c. Red. Deb.	92—97
10,000	Nov. 6 '33	6	4	Cape Town, Ltd., 4½ p.c. Cu. Pf.	45/—65/—
626,860	July 19	6	6	Cardiff Con. Ord.	117—122
24,500	June 15	7	7	Colombo 7 p.c. Pref.	21/6—23/6
764,169	Sept. 27	-/9.56	-/9.56	Colonial Gas Assn. Ltd. Ord. ..	⅛—¼
400,000	"	1/3.298	1/3.298	Do 8 p.c. Pref. ...	⅛—¼
1,748,090	July 22 '40	2	3	Commercial Ord.	70—75
620,000	June 7	3	3	Do. 3 p.c. Deb.	66—71
286,344	Aug. 23	5	5	Do. 5 p.c. Deb.	108—113
807,560	" 23	6	6	Croydon sliding scale	121—126
644,590	"	5	5	Do. max. div.	102—107
620,385	June 28	5	5	Do. 5 p.c. Perp. Deb. ...	120—125
179,500	Feb. 22	5	5	East Surrey 'B,' 5 p.c.	87—92
176,461	June 28	5	5	Do. 5 p.c. Deb. (Irred.)...	118—123
250,000	July 26	4	6	Gas Consolidation Ord. 'B' ...	19/—21/-
250,000	May 10	4	4	Do. 4 p.c. Red. Cum. Pref.	18/—20/-
19,107,811	Aug. 9	†1	3	Gas Light & Coke Ord. ...	19/—20/—a
2,600,000	"	†1½	3½	Do. 3½ p.c. max.	75—80
4,477,106	"	4	4	Do. 4 p.c. Con. Pref. ...	94—97
2,993,000	July " 12	3¾	3¾	Do. 3¾ p.c. Red. Pref. ...	93—96
8,602,497	May 31	3	3	Do. 3 p.c. Con. Deb. ...	84½—87½
3,642,770	"	5	5	Do. 5 p.c. Red. Deb. ...	107—110
3,500,000	"	4½	4½	Do. 4½ p.c. Red. Deb. ...	106—109
700,000	Sept. 6	3½	3½	Do. 3½ Red. Deb.	96—99
5,600,000	May 13 '40	4	8	Imperial Continental Cap. ...	96—99
43,820	July 26	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100
231,978	Aug. 23	5	5	M.S. Utility 'C' Cons.	95—100
918,657	"	4	4	4 p.c. Cons. Pref.	89—94
675,000	May 3	‡4	‡4	Montevideo, Ltd.	95—100
300,000	April 27	9	7	Oriental, Ltd.	110—115
368,537	June 15	3½	2½†	Plymouth & Stonehouse 5 p.c.	97—102
621,667	Aug. 16	7½	7½	Portsmouth & Gosport Cons.	120—125
2,381,363	May 17	4†	4†	Primitiva Holdings, Ltd. Ord.	12/—14/—
233,900	June 15	3½	3½	Do. 6½ p.c. Red. Cum. Pref.	99—104
648,999	Sept. 13	1/1⅛	1/1⅛	Severn Val. Gas Cor. Ld. Ord.	20/9—21/9
597,972	"	4½	4½	Do. 4½ p.c. Cum. Pref. ...	20/—21/—
2,528,714	Aug. 23	7½	7½	South East'n Gas Cn. Ld. Ord.	20/9—21/9
1,000,000	"	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/9—20/9
1,068,869	"	4	4	Do 4 p.c. Irred. Cum. Pref.	19/—20/-
6,709,895	Feb. 22	†1	—	South Met. Ord.	89—92
1,135,812	Aug. 16	†6	6	Do. 6 p.c. Irred. Pref. ...	125—130
850,000	"	†4	4	Do. 4 p.c. Irred. Pref. ...	90—95
1,895,445	June 28	3	3	Do. 3 p.c. Perp. Deb. ...	83—87
1,000,000	July 12	5	5	Do. 5 p.c. Red. Deb. ...	103—108
1,543,795	Aug. 3	4	4	South Suburban Ord. 5 p.c ...	97—102
512,825	"	5	5	Do. 5 p.c. Perp. Pref. ...	107—112
500,000	"	4	4	Do. 4 p.c. Perp. Pref. ...	88—93
250,000	"	3½	3½	Do. 3½ p.c. Red. Pref. ...	90—95
888,587	June 15	3	5	Do. 5 p.c. Perp. Deb. ...	120—125
750,541	Aug. 16	6	5	Southampton Ord.	95—100
350,000	" 15	5½	5½	Swansea 5½ p.c. Red. Pref. ...	100—105
1,076,495	Aug. 3	5	5	Tottenham & District Ord. ...	108—113
338,555	"	5	5	Do. 5 p.c. Pref.	106—111
453,380	June " 7	4	4	Do. 4 p.c. Perp. Deb. ...	99—104
1,247,505	May 31	4	6	U. Kingdom Gas Cor. Ord. ...	21/6—22/6
1,085,952	" 17	4½	4½	Do. 4½ p.c. 1st Cum. Pref. ...	19/6—21/6
772,709	"	4	4	Do. 4 p.c. 1st Red. Cum.Pref.	19/—21/—
745,263	June 21	4½	4½	Do. 4½ p.c. 2nd Non.Cum. Pf.	17/—19/—
1,200,000	Sept. 13	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100
380,606	Aug. 16	6¾	6¾	Uxbridge, &c., 5 p.c.	118—123
1,371,138	" 3	6	5	Wandsworth Consolidated ...	107—112
2,525,768	"	5	4	Do. 4 p.c. Pref.	91—96
1,343,964	June 15	5	5	Do. 5 p.c. Deb.	120—125
383,745	"	4	4	Do. 4 p.c. Deb.	99—104
558,342	Aug. 9	5	5	Watford & St. Albans Ord. ...	110—115
300,000	June 7	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95

SUPPLEMENTARY LIST

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Sept. 30
351,685	June 15	5	5	Brighton, &c., 5 p.c. Perp. Deb.	122—127
415,250	"	4	4	Bristol Gas Co., 4 p.c. New Deb.	97—102
140,205	July 26	7	7	Cambridge, &c., 7 p.c. Cons. 'B'	135—140
295,932	Aug. 16	5	5	Cheltenham, 5 p.c. Cons.Ord....	97—102
42,500	June 15	4	4	Do. 4 p.c. Perp. Deb....	102—107
150,000	Aug. 23	4	4	Croydon Gas, 4 p.c. Pref. (Irr.)	89—94
130,000	June 28	4	4	Do. 4 p.c. Deb. ...	101—106
146,700	Aug. 30	5½	5½	East Surrey, 5½ p.c. Pref. 'A' ...	110—115
53,220	"	6	6	Do. 6 p.c. Cum. Pref. ...	120—125
...	Aug. 19 '40	6	4	Eastbourne, 'B' 3½ p.c.... ...	55—60
117,425	Feb. 5 '40	8	8	East Wight Cons. 5 p.c. ...	65—70
239,135	July 26	5	5	Gas Consolidation 'A' Ord. (£1)	18/—20/-
156,600	Aug. 16	5	5	Hampton C't, 5 p.c. Cons. Ord.	95—100
18,000	Dec. 29 '41	3½	3½	Malta & Med'n., 7 p.c. 1st Pref.	30—40
10,845	June 30 '41	3½	3½	Do. 7½ p.c. 2nd Pref.	30—40
50,000	Aug. 23	£5 4 6	£5 4 6	Mid. South. Utll., 'A' Cons. 5 p.c.	90—95
70,380	June 21	5	5	Newport (Mon.), 5 p.c. Deb...	110—115
65,000	Aug. 16	5	5	North Middlesex, 5 p.c. Pref. ...	105—110
70,000	Sept. 13	5	5	Plymouth & Stone., 5 p.c. Deb.	112—117
76,501	June 21	4	4	Reading, 4 p.c. Perp. Deb. ...	97—102
74,777	Sept. 30	4	4	Romford, 4 p.c. Debs. (Reg.) ...	95—100
21,000	June 15	5	5	Slough, 5 p.c. Perp. Deb. ...	120—125
211,740	" 28	5	5	Southampton, 5 p.c. Red. Deb.	103—108
363,575	July 1	5	5	Tottenham, 5 p.c. Reg. Red. Mt.	99—102
202,019	Aug. 16	7½	7½	Tunbridge Wells, 4 p.c. Scale ...	125—130
135,257	June 15	5	5	Uxbridge &c., 5 p.c. Perp. Deb.	121—126

PROVINCIAL EXCHANGES

					Quotations Sept. 24
804,948	March 1	5	5	Bath Cons.	102—105
122,577	Aug. 9	7	5	Blyth 5 p.c Ord.	114—116
1,667,250	July 19	5	5	Bristol, 5 p.c. max.	114½—116½
120,420	June 15	4	4	Do. 1st 4 p.c. Deb.	100½—102½
415,250	"	4	4	Do. 2nd 4 p.c. Deb. ...	100½—102½
3 28,790	"	5	5	Do. 5 p.c. Deb.	116—120
157,150	Aug. 3	6½	5	Chester 5 p.c. Ord.	98—102
92,500	June 15	4	4	Do. 4 p.c. Pref.	78—80
36,430	"	3½	3½	Do. 3½ p.c. Deb.	77—81
41,890	"	4	4	Do. 4 p.c. Red. Deb. ...	97—99
542,270	Aug. 9	9	6	Derby Cons.	121—126
55,000	June 15	4	4	Do. 4 p.c. Deb.	97—102
10,000	Aug. 9	10	10	Great Grimsby 'A' Ord. ...	160—170
6,500	"	10	10	Do. 'B' Ord.	160—170
79,000	"	10	10	Do. 'C' Ord.	150—160
732,000	Aug. 23	4	4	Hartlepool G. & W. Cn. & New	90½—91½
2,167,410	" 16	5½	5	Liverpool 5 p.c. Ord.	108½—109½
306,083	July 15	4	4	Do. 4 p.c. Deb.	100—102
20,000	June 21	5	5	Long Eaton 5 p.c. Pref.	9—11
80,000	"	5	5	Do. 5 p.c. Deb.	100—105
2,430,267	Aug. 3	5½	5½	Newcastle and Gateshead Con.	23/9—24/3a
682,856	"	4	4	Do. 4 p.c. Pref.	99—101
776,706	June 28	3½	3½	Do. 3½ p.c. Deb.	96½—97½
277,285	April 27	5	5	Do. 5 p.c. Deb. '43 ...	99—101
13,200	Sept. 16	8½	7	Pontyp'l Gas & W. 10 p.c. 'A'	11½—12½
13,600	"	6	5	Do. 7 p.c. 'B'	9½—10½
40,000	"	5	6	Do. 7 p.c. 'C'	9½—10½
106,280	Aug. 9	10	10	Preston 'A' 10 p.c.	167—169
188,219	"	7	7	Do. 'B' 7 p.c.	124—129
1,806,339	" 30	6½	6½	Sheffield Cons.	136—140
95,000	July 5	4	4	Do. 4 p.c. Deb.	98—100
332,351	Sept. 6	6	6	Sunderland 6 p.c. max. ...	113½—115½
192,150	Aug. 9	5	5	Weston-super-Mare Cons. ...	105—107
64,338	July 5	4	4	Do. 4 p.c. Deb.	99—101
33,340	"	7½	7½	Do. 7½ p.c. Deb.	142—147

a—The quotation is per £1 of Stock. * Ex. div. † For year. ‡ Paid free of income-tax.